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ABSTRACT

The history of the University of New Mexico during 1967-1972, when a new president was appointed, is examined. Attention is focused primarily on the environmental milieu relating to federal support of university research and the president's leadership initiative in establishing the Office of the Vice President for Research. In reviewing institutional developments, consideration is given to environmental change, institutional adaptation, and leadership. Executive succession appeared to come at a time in the university's development when a shift toward research was necessary to maintain the institution's equilibrium with its external environment. The president recognized not only the importance of faculty research but the need to initiate change in the university's internal structure. The Office of Vice President for Research was needed to provide administrative support for faculty research and to establish an administrative proposal-review mechanism and a grant-evaluation and reporting mechanism. An overview of the linkages between universities and the federal government is included, along with information on the ethnohistorical approach used in collecting the data for the case study. (SW)

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Executive Succession and Institutional Change: A Case Study of the University of New Mexico, 1967-1972

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LARS G. BJORK, Ph.D.
National Institute of Education
Office of Educational Research and Improvement
United States Department of Education
Washington, D.C. 20208

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ABSTRACT

EXECUTIVE SUCCESSION AND INSTITUTIONAL CHANGE:
A CASE STUDY OF THE UNIVERSITY OF NEW MEXICO, 1967-1972

Lars G. Bjork, Ph.D.
University of New Mexico

Universities, like many other organizations, are shaped by a combination of internal and external environmental forces that threaten their survival, stimulate adaptation, and provide opportunities for institutional growth. Conditions of change and uncertainty not only emphasize the importance of understanding the forces and factors that allow universities to maintain equilibrium with the environment, but also underscore the strategic role of institutional leaders in this crucial activity. This case study contributes to gaining insights into environmental change, institutional adaptation, and leadership. Executive succession occured at a time in the University's development when research emerged as a preeminent activity requiring structural reorganization of the institution. The purpose of this ethnohistorical case study is to provide a contextually rich, descriptive narrative of executive succession and the establishment of the Office of the Vice President for Research for use in graduate seminars.

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Introduction

Historically, the federal government has relied on academic institutions to conduct a substantial part of its mission-oriented, applied research. The relationship between the federal government and the nation's research institutions was enhanced as the federal government realized that scholarly and scientific pursuits were a significant resource available for resolving social problems, improving the economy, and strengthening national security.

The influence of the federal government on university-based research and development activities was profound. A shift in the financial support for research from official university sponsors to the federal government began during the years just prior to World War II. This shift affected the universities by creating a substantial dependency on federal support of research, focusing increased attention on scholarly research and publication, and establishing research expenditures as a proxy measure of both institutional activities and stature.

Since the early 1970's, universities that had participated in the rapid expansion in federal support for research during the previous decades have found it necessary to adapt to changing circumstances. The effects of a number of economic factors between 1968 and 1978 contributed to a no-growth or static level of federal support for university research. Combined with internal conditions of financial austerity, this contributed to a sense of uncertainty in the universities' research funding environment (Smith and Karlesky, 1977).

Universities, like many other organizations, are confronted and shaped by a combination of internal and external environmental forces that threaten their survival, stimulate adaptation, and provide opportunities for institutional growth. Those who administer institutions of higher education are faced with continually changing environments to which they must adapt. The manner in which both internal and external environments affect institutions of higher education is an area of crucial interest to university administrators. Conditions of change and uncertainty emphasize the importance of understanding the forces and factors that allow the university to maintain a strategic coalignment with its external environment.

To contribute to the development of that understanding, this case study exmaines the history of the University of New Mexico (UNM) during the period 1967-1972, when a new president was appointed. Executive succession appeared to come at a time in UNM's development when a shift towards research was necessary for maintaining the institution's equilibrium with its external environment. The president, occupying a strategic position on the boundry of the University and its external environment, recognized not only the importance of faculty research but also the need to initiate change in the organization's internal structure.

This study focuses primarily on the environmental milieu (Mortimer and Tierney, 1979) as it relates to federal support of university research during a "bounded" (Stake, 1978) period of time, 1967-1972, and the leadership initiatives of the new president in establishing the Office of the Vice President for Research.

The purpose of this study is to provide a contextually rich, descriptive narrative of UNM when it moved from an undergraduate teaching institution in the direction of a graduate research university. Chapter III, entitled "Methodology," discusses the ethnohistorical approach used in collecting the data for this case study, suggests the importance of developing a conceptual framework for analysis, and discusses both the value of developing grounded theory and the limitations of making broad generalizations from limited ranges of data. It is hoped that this case study will contribute to the development of qualitative research skills and raise further questions into this organizational phenomena.

Chapter I

Linkages Between Universities and the Federal Government

Linkages between Universities and the Federal Government

The association between science and the federal government is a unique American phenomenon (Veysey, 1963) that emphasizes linking practical public service with applied scientific research inside an academic institution. The potential of this relationship was recognized and advocated by both Franklin and Jefferson early in the nation's history (Dupree , 1957; Price, 1965; Smith and Karlesky, 1977; Veysey, 1963). The relationship between the federal government and science has proved to be mutually advantageous: government agencies accomplish their missions with the assistance of trained scientists, and the government's support of science provides a source of strength to the emergence of scientific research in institutions of higher education.

Reliance on colleges and universities for the performance of applied research has been described as modest, small, timid, and intermittent (Cowley, 1980; Dupree , 1957; Millet, 1952; Seitz, 1966). Despite such characterizations, the federal government's reliance on institutions of higher education has established an operational precedent that has greatly shaped the relationship between the federal government and universities that undertake research activities for the government.

During the American industrial revolution, government and industry began to utilize scientific research capabilities in universities. The realization "that scientific research had a natural place in the pattern of higher education in the universities" followed (Seitz, 1966, p. 4). The acceptability of such scientific research to universities contributed to the emergence of American science during the 1870s and 1880s. During this period, American colleges were influenced by the

German example and adopted a number of practices that contributed to the establishment of the American university (Nagi and Corwin, 1972). Scientific disciplines emerged and involvement in scientific research became an intrinsic function of the institutions (Seitz, 1966; Veysey, 1965). The compatibility between scientific research and higher education was viewed by both academic institutions and the federal government as an important asset in the future development of the nation (Dupree , 1957; Veysey, 1965; Wolfle, 1959). Veysey (1965) and Dupree (1957) note that during the 1890s, as the demands on federal, mission-oriented agencies increased (e.g., the Department of Agriculture), the federal government increased its utilization and support of scientific research in American universities with grants and contracts (Ben-David, 1972; Handler, 1966; Price, 1965; Rivlin, 1961). Such increases in support substantially enhanced the universities' ability to perform basic and applied research. The financial support provided by the federal government enabled the universities to assume increasing responsibility for conducting the major portion of the government's research requirements (Wolfle, 1959).

The pursuit and support of science by the federal government inside universities grew rapidly during and after World War I. Dupree (1957) and Veysey (1965) note that during the First World War, science was perceived as one among many elements contributing to the war effort. However, during the 1930s, this narrow perspective changed, and scholarly and scientific pursuits were also recognized as valuable resources in finding solutions to difficult, pressing national economic and social problems. The practice of linking applied science with practical public service developed as a dominant them in the federal

government's rationale for employing and financially supporting university-based research.

The relationship of the federal government and the university research community entered a new era during the 1940s, when both the diversity and scale of research expanded substantially. The federal government accepted the major financial responsibility for the support of scientific research and for establishing what has been described as a partnership (Babbidge, 1968; Gladieux, 1976; Hornig, 1966; Smith and Karlesky, 1977), a symbiotic relationship (Nagi and Corwin, 1972), and a state of mutual dependence (Ashworth, 1972; Kidd, 1959; Price, 1965) with institutions of higher education. Corson (1975) notes that the rapid expansion of federal financial support for university-based research originated in the years just prior to World War II, when the government sought the assistance of highly-skilled faculty researchers.

During and after World War II, federally-sponsored research rapidly became a major campus activity. Federal grants and contracts became the principal means of providing support for scientific research; they were awarded on the basis of the merit of individual scholars or groups of scholars rather than to their respective institutions. Federal support for research rapidly overshadowed university resources as the primary means of funding scholarly research activities (Corson, 1975; Ford Foundation, 1978; Hornig, 1959; Kidd, 1959; Klopsteg, 1959; Smtih and Karlesky, 1977; Strickland, 1967). This shift in research support from the universities themselves to the federal government was an important issue for science. Federal support for research became a fundamental characteristic of government-university relationships during the post-War period (Dupree , 1957; Heimovicks, 1971; Murphy,

1971; Orlans, 1968). Indeed, "[I]n the process, important precedents were established for the future partnership between the government and the universities in the support of . . . research" (Smith and Karlesky, 1977, p. 13). Finn (1978) notes that the support of the federal government was directed towards accomplishing the practical public-service goals of its mission-oriented agencies rather than towards encouraging the development of the research capabilities of universities. However, as an indirect result of government support, universities did nonetheless enhance their internal research capabilities. The federal government emerged as the principal sponsor of scientific research and the universities were recognized as the locus for carrying out government research.

The massive, post-World War II, federally-sponsored research effort had a significant and lasting effect on American universities. Ben-David (1972) identifies "two waves of massive infusion of federal funds into research and development--one during World War II, and another in the fifties--as a reaction to the Soviety success with thermonuclear bombs and satellites" (p. 106). Corson (1975) notes that federal funds for the support of university-based research increased from $4 million, in current 1972 dollars,[3] in 1940-1941 to $225 million in 1945-1946 (p. 128). This substantial increase, stimulated by the war crisis, was followed by a period of immediate decline following World War II. A renewed interest in the support of university-based research in the early 1950s was stimulated by two prominent men, Dr. James B. Conant and Dr. Vannevar Bush, who, according to Millet (1952), raised

[3]Comparative data on federal expenditures for university-based research were available only in current 1972 dollars for the years 1953, 1960, and 1968.

their voices

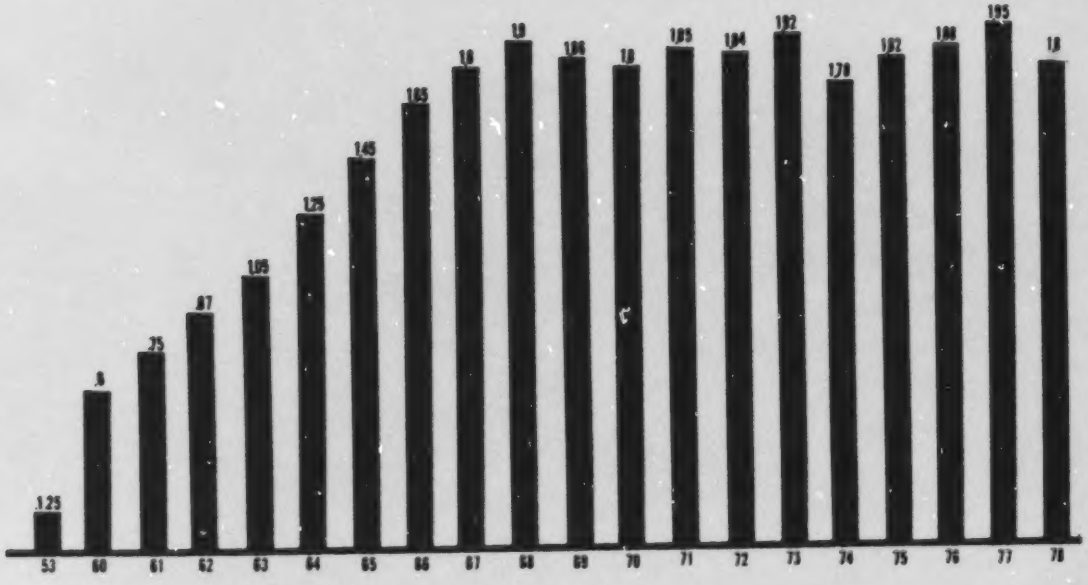
> to warn that individual scholarly research must not be allowed to disappear. [They believed] here was a vital need for the unhurried, deeply reflective scholar [and] recognized that present financial pressures upon universities [were] making his support increasingly precarious (p. 26).

In the 1950s, scientific knowledge and the strength of university research were considered major factors in the nation's survival. The renewed interest became a "spectacular expansion in the American research effort that lasted a decade" (Smith and Karlesky, 1977, p. 16). In 1953, federal expenditures for university-based research and development amounted, in current 1972 dollars, to $125 million, increased to $229 million in 1957 (Tuckman and Whalen, 1980, p. 156), and as a result of the Soviet Sputnik, rose to $600 million in 1960. It reached a peak in 1968 of $1.9 billion (Fig. 1, p. 14).

This massive infusion of federal research support to universities had several consequences: (1) attention to teaching declined as interest in research increased (Babbidge, 1968; Ben-David, 1972); (2) the central administration of universities and their departments were weakned as opportunities for individual research expanded (Ben-David, 1972; Gladieux, 1976); (3) emphasis shifted from undergraduate towards graduate education and research training (Ben-David, 1972); (4) a condition of financial dependency on federal support for research emerged (Heimovicks, 1971; Price, 1965); (5) applied, mission-oriented research, determined by the federal government, surpassed university-supported basic research; (6) new political relations between the universities and the federal government were established (Kidd, 1967; Price, 1965),

Figure 1

Total Expenditures of Federal Research and Development Support by Universities, 1953-1976 (Constant 1972 Dollars/Billions)[1]



[1]Data for this figure are based on Smith and Karlesky (1977, p. 18) and the National Science Foundation (1978, p. 2).

and (7) the manner in which research was organized, carried out, and funded within the institutions of higher education changed (Kidd, 1959; Klopsteg, 1959). Hornig (1959) notes that as a consequence of this unprecedented and massive support for scientific research, the "shape of science and the direction of scientific progress were no longer a matter for the scientific community alone" (pp. 16-17).

With the influx of federal dollars, both the shape and direction of scientific research became an important part of the public enterprise. These were directly related to the government's ability to meet national needs, for the federal government depended heavily on the strength of the nation's system of higher education and its research capabilities. Consequently, the federal government actively pursued the sponsorship of research during the 1950s and 1960s in a manner that would not only accomplish agency missions but also enhance the ability of academic institutions to perform high-quality research. There is little question that the investment of the federal government in higher education was both "large and its influence profound" (Finn, 1978, p. 1). Orlans (1962) observes that the relationship between the federal government and institutions was "on the whole decidedly beneficial" (p. 133). In 1978, The Ford Foundation recognized a need for excellence in higher education that could not be achieved without a strong partnership between the universities and the federal government. Research activities increased, becoming both broader in scope and more specialized in nature; they also became enormously more expen-

sive and dependent on the financial support of the federal government. Such dependency made the universities vulnerable to federal reductions in financial support.

Throughout the 1950s and 1960s, universities adjusted to dramatic shifts in their external research-support environments. Since the early 1970s, universities have found it necessary to adapt to changing conditions as the effects of a number of combined economic factors force reductions in federal support for research. The decline in the national economy, financial austerity in university budgets, and the reduction in support for research by the federal government are deepening the concern of universities over budgetary instability and the health of campus research (Smith and Karlesky, 1977). This confluence of events has reduced the rate of expansion of federal support for research and development. Although "the total costs of a university's research effort," as Smith and Karlesky (1977) note, are "rarely assumed by any single force" (p. 163), it is evident that the primary source of funding for research, the federal government, exerts a powerful influence in the conduct of that activity on university campuses.

The literature on shifts in financial support for research from universities to the federal government just prior to World War II, subsequent dramatic increases in federal support, and vigorous expansion of research in universities during the 1950s and 1960s suggests that institutions of higher education adapt to these changes but become in the process dependent on the federal government for the support of research. Between 1968 and 1977, the expansion in federal support for RD&D in universities leveled off and forced institutions to adjust from

the expansionary conditions of the fifties and early sixties--an era of munificent resources--to a period of uncertainty and leveling resource availability. The period between the late 1960s and the mid-1970s underscored institutional vulnerability to shifts in levels of federal support that had increased since World War II.

The growth in the transfer of federal funds to universities for research and development between 1953 and 1968 proceeded at a rapid rate, increasing fifteen times from $1.25 million to $1.9 billion (Fig. 1, p. 14). University-based research and development flourished during this period (Finn, 1978; Smith and Karlesky, 1977; Tuckman and Whalen, 1980). However, from 1968 to 1976, the combined effects of inflation, the "deemphasis on defense and space programs" (National Science Foundation, 1978, p. 8), and a shift to civilian-related, applied research caused federal support to universities to decline by an estimated 3% (Smith and Karlesky, 1977). Federal support of university research changed from one of rapid expansion to a static level of support. It was a period characterized as one of "uncertainty" (Smith and Karlesky, 1977) that "was not conducive to efficient on-going academic research performance" (National Science Foundation, 1977, p. 14). "Particularly troubling for institutions of higher education was the decline in federal support for basic research, which in constant [1972] dollars, fell by 15 percent between 1968 and 1976" (Finn, 1978, p. 114). A modest increase from $1.85 billion in 1976 to $1.95 billion in 1977 and an estimated increase in 1978 to $2.5 billion (National Science Foundation, 1978, p. 2) were the result of an "increased emphasis on finding alternative sources of energy and recent administrations'

policies to strengthen the federal basic research effort" (National Science Foundation, 1978, p. 7), "concerns by both the Ford and Carter Administrations regarding the health of this nation's R&D enterprise" (National Science Foundation, 1977).

The reduction in federal funding for university-based research during the decade between the mid-1960s and mid-1970s underscores the significant change in the federal government's concept of the relationship between the government and the universities (Smith and Karlesky, 1977). The concept of a symbiotic, patron-performer alliance was replaced by a purchaser-vendor relationship. Tight federal budgetary conditions led to an effort on the part of the federal government to connect funded research to quick results (Ford Foundation, 1978). In this new framework, universities were viewed as just one of many competing performers that could be used to support the federal government's mission-oriented agencies. Cheit (1971) describes the effect of the federal government's reduction in support for R&D and the apparent shift in its traditional relationship with universities for the conduct of research as being a "depression in higher education" (p. 139). The reduction in support and shift in the government's traditional relationship with universities were significant, contributing factors in forcing universities to adapt to changes in their external environment (Finn, 1978; Smith and Karlesky, 1977).

In the post-World War II era, massive support for R&D in universities had created a dependence on federal funds that tended, when reduced, to make institutional budgets unstable (Corson, 1975). The financial dependence of universities on federal support for R&D placed

the universities in a position of vulnerability, a condition characterized by Kidd (1966) as a state of "turbulent dependency" (p. 65). The literature suggests that the fragile financial stability of university-based research budgets between 1968 and 1976 caused institutions to adapt in an attempt to maintain a state of financial stability for the support of research and to maintain equilibrium with their external environments (Emery and Trist, 1965; Katz and Kahn, 1978). Universities became increasingly involved in the political process (Kidd, 1966), directly contacting federal agency administrators, state legislators, Senators and Congressmen to mobilize support as a means of insuring the predictability and continuous flow of federal research funds. Institutions also placed an increasingly high priority on (1) reallocating internal resources; (2) adjusting their internal organizational structures; (3) establishing or enhancing offices of research to improve their competitive capabilities, and (4) establishing informal, inter-institutional linkages to improve the flow of information and to increase opportunities to participate in research (Kidd, 1959; Klopsteg, 1959).

The dramatic increase in federal support for university-based research and development between 1960 and 1968 had a profound impact on the evolution of established and developing institutions. The literature suggests that federal support stimulated the development of campus research, shaped its direction, dominated its continuance and contributed to the emergence of research as a measure of institutional stature.

The Development of the University of New Mexico in the Direction of a Research University

In the years just prior to 1968, when federal support for research and development peaked, some faculty members and administrators at the University of New Mexico noted the importance of engaging in a broad range of research, development, and demonstration activities. The Office of the Vice-President for Research and Dean of the Graduate School was established in 1968 in part as a response to the desire of some faculty members and administrators to encourage and promote research on the campus. Internal restructuring of the University's administration was carried out to redistribute the work-load of the Academic Vice-President and to promote and support research and development activities on campus. These actions symbolically recognized the importance of research internally as well as the necessity for presenting the institution externally as a research university. The importance of RD&D activity at the University of New Mexico "hadn't been addressed as well as it had in more mature institutions" (Personal interview, Travelstead, July 26, 1982). The University

> took this step as an effort to give direction and emphasis to something that we thought was important for an institution that hopes to be a great university. . . . It did say . . . to other institutions, that we were, in our evolution and growth, trying to recognize and to do more in the whole area of research (Personal interview, Travelstead, July 26, 1982).

The University adjusted its internal organizational structure and increased its external contacts in an effort to promote and facilitate RD&D activities and to assist faculty in securing resources. The data indicating these developments will be discussed in detail in the following chapter . Further, in order to facilitate the University's development in the direction of a graduate research institution, key administrators took the following steps: (1) established the Office of the Vice-President for Research and Graduate Affairs; (2) utilized the existing Office of Research Administration and Fellowship Services to facilitate and encourage increased faculty participation in research; (3) reduced faculty teaching loads to encourage more RD&D activities; (4) secured and redistributed a larger portion of the return on overhead to support RD&D resource acquisition efforts; (5) hired a Vice-President with expertise in research administration to provide leadership; (6) shifted "from a custodial to an entrepreneurial mode" (Personal interview, Kasner, May 20, 1982) in development of research support; (7) established inter-institutional linkages with other regional universities, and (8) increased contacts with State legislators, federal agency directors, and Congressional delegations.

During the 1968-1978 period, when federal funds for research leveled, the University increased its internal research support and external development activities. In Constant 1972 dollars, the University nearly doubled its total expenditures for all types of research, development, and dmmonstration activities from $6.5 million in 1968 to $12 million in 1978. A significant indicator of its success in establishing its position as a major research university was its listing by the National Science Foundation in "Total Federal Obligations to 100 Universities and Colleges receiving the Largest

Amounts, FY 1972." The University was ranked 54th in 1972 and has essentially retained that ranking between 1972 and 1978.

During the years 1968-1978, when federal support for university-based RD&D activities was at a static level, the State of New Mexico, stimulated in part by the 1973 Arab oil embargo, actively encouraged and supported university-based energy research (Personal interviews, Kasner, May 20, 1982; Perovich, July 26, 1982; Silverman, March 24, 1982). New Mexico Governor Apodaca and the State Legislature supported the use of a portion of the State's surplus funds to establish an energy-research program in New Mexico and to utilize the research capabilities in the State's universities (Personal interviews, Kasner, May 20, 1982; Silverman, March 24, 1982). During the period after 1973, the State put "a substantial amount" (Personal interview, Perovich, July 26, 1982) of money into supporting university-based research. The funds were viewed as "seed money [a means of getting] cranked up" (Personal interview, Perovich, July 26, 1982) to conduct energy research. Thus, State support and encouragement of university RD&D activities in general and energy research in particular came at a time when the University was aggressively seeking to establish and maintain itself as a research institution in a climate of static federal support.

The Office of the Vice-President for Research and the Development of Sponsored Research, 1973-1975

Dr. Paul Silverman came to the University of New Mexico in 1972 as a professor and Chair of the Department of Biology. He came from the University of Illinois, where he had been the Director of the School of Life Sciences, a senior administrative position equivalent to a deanship. As Director of the School, he was deeply involved in both research and research administration. As Dr. Travelstead noted, the "interest and experience of Paul Silverman was one of the big factors that caused people to think that he should go into the Office of the Vice-President of Research . . . he was an able man" (Personal interview, Travelstead, July 26, 1982).

Once appointed as Acting Vice-President in 1973, Dr. Silverman began to re-shape the Office of the Vice-President for Research vigorously. L. E. Roberts notes that Dr. Silverman "structured the office. He set up a viable mechanism which we still have. [He] defined the mission of the office, set up the procedures, and he set the tone for support on this campus" (Personal interview, Roberts, June 29, 1982).

Dr. Silverman noted that Dr. Heady provided a great deal of support for his research development efforts:

> there was a mood and an atmosphere that evolved because of Dr. Heady's identification that this was an important role . . . And the infrastructure that existed, that is, Jerry Kasner, and the support [of] . . . John Perovich and the intellectual support that we had from Chester Travelstead . . . [these factors] coalesced to generate a kind of trust that enabled me, I believe, to speak with a kind of confidence about the campus that enabled me to provide

> leadership . . . that otherwise I could not have done (Personal interview, Silverman, March 24, 1982).

Dr. Silverman observed:

> In that sense Ferrel Heady gave me more opportunity to devote more time to encouraging research and development. So, that in itself was an important restructuring of the position. I was able to devote far more time to establishing relationships both within the campus, finding out what was happening, encouraging developments by my interest and my awareness, then going out and meeting and selling the potentials of the institution, not only on the federal scene [and in the state] but also through an industrial affiliation program. And as an outgrowth of that was a restructuring of Jerry Kasner's role to become much more interested in encouraging faculty to engage in research, to make disclosures of patents and licenses (Personal interview, Silverman, March 24, 1982).

Faculty support was also forthcoming. According to Travelstead,

> [F]aculty in general began to take satisfaction in that this institution had taken and was continuing to take that step which did give better prestige and reputation, even though some of them, individually, did not participate in it. I think it had a good effect on the faculty . . . [and there was a] . . . general feeling that the institution had taken a good step and was making progress toward maturing as an institution by giving more attention to research (Personal interview, Travelstead, July 26, 1982).

By 1974, Dr. Heady's goal of obtaining research funding for the University from outside sources began to be realized.

The widely-believed decline in federal support for sponsored research did not have a serious impact on the University of New Mexico during the 1972-1975 period. It was during this period that the institution began instead to move more aggressively in developing its research capabilities.

Mr. Kasner observed:

> [W]e had a feeling that everyone was screaming, The sky is falling! the sky is falling! The Chicken Littles were going crazy . . . I ignored these [people] and I think Paul Silverman ignored them . . . he said to himself, that's a factory, but let's try. And that's what we did when a lot of people [in the nation] were retrenching . . . [the University of New Mexico] was going externally, it was in a marketing mode, an entrepreneurial mode, when all other universities were wringing their hands nationally. All we did was ignore the national scene and said, Look, there's only one way to do it and that is to try. And we tried. We tried hard (Personal interview, May 20, 1982).

Kasner continued:

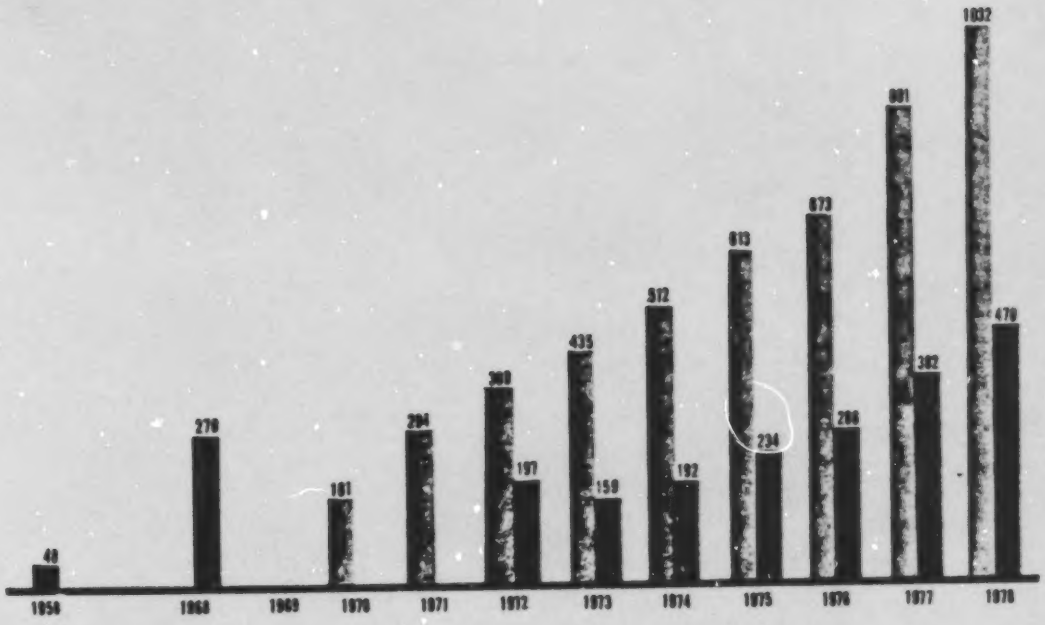
> My impression is that even when things were bad [nationally] UNM did very well because they were relatively aggressive . . . those universities which started falling down just assumed that they couldn't get what they wanted to get, and they should have been competitive (Personal interview, Kasner, May 20, 1982).

The data support this impression. For example, the number of proposals submitted by faculty increased 46% between June 1971--June 1975, from 284 proposals to 613 proposals (see Fig. 2, p. 51).

During the 1972-1975 period, when the Office of the Vice-President for Research and Graduate Programs was structured, viable support mechanisms were established and the mission of the Office was defined by Dr. Silverman. An able researcher and administrator, Dr. Silverman focused on encouraging, supporting, and developing sponsored research on campus. An aggressive research development program created considerable impact on sustaining and increasing the research momentum built up by some faculty researchers. During 1972-1975, both proposals submitted and research expenditures increased.

Figure 2

University of New Mexico Sponsored Research,
Development, and Demonstration Proposals,
Submitted and Funded, 1958-1978[1]



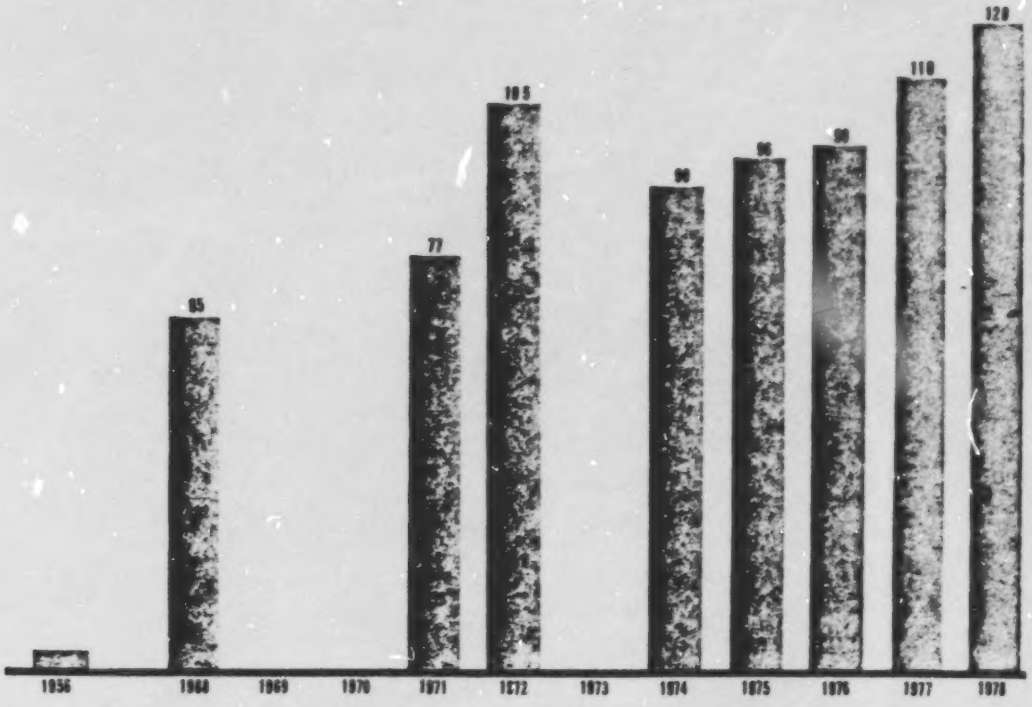
Total number of RD&D proposals submitted
Total number of proposals funded

[1]Statistical data for 1969 not available.

The University began its efforts to increase its research activities during a period when the growth in federal research support had become static. Many research administrators nationwide perceived this situation as a decline in support. However, the University pursued the development of research on campus in an aggressive, entrepreneurial way and ignored the "prognostications of the doom-sayers" (Personal interview, Kasner, May 20, 1982). It tried hard to improve its research capabilities and to generate support. The University's expenditure of research, development, and demonstration funds (Fig.3)

Figure 3

The University of New Mexico's Expenditures[1] of Research, Development, and Demonstration Funds,[2] 1956-1978[3]



[1]Expenditures refer to total amount of research support funds spent by the institution received from State, federal, foundation, and industrial sources.

[2]The University reported expenditures of funded projects as a total amount and identified expenditures for basic research, applied research, demonstration or training programs.

[3]Data were not available for the years 1969, 1970, and 1973.

from grants and contracts increased (in constant 1972 dollars) from $7.7 million in 1971 to $9.6 million in 1975, an increase of 12.5%. During 1972-1975, when the nation experienced a period of decline or recession, the University of New Mexico secured a larger share of available research support funds than it ever had. Of these, approximately 90% of the total RD&D funds were federal, 5% were State, 3% were from business contracts, and 2% were from private foundations. In 1972, for the first time, the University was listed by the National Science Foundation in its "Total Federal Obligations to 100 Universities and Colleges receiving the largest amounts, FY 1972" (Fig. 4):

Figure 4

The University of New Mexico's Position in the National Science Foundation's Ranking of the Top 100 Institutions in Total Federal Research and Development Obligations for Fiscal 1972-1978[1]

Year	Ranking	Year	Ranking
1972	54	1976	53
1973	77	1977	49
1974	61	1978	57
1975	63		

[1]E. B. Kasner, "UNM/ORA Statistical Summary," UNM, May, 1982, Attachments 1-7.

Development of the Office of Research and Fellowship Services As a Research Support Unit

The Office of Research and Fellowship Services was established in 1957 to provide support services for research faculty. The data indicate that its first director, Harold Walker, had a "rough time of it" (Personal interview, Heady, July 19, 1982) because the Administration selected him without adequate consultation with the faculty. The faculty had a "hands-off attitude" (Personal interview, Heady, July 19, 1982) about working with him; this made his job more difficult and compromised the effectiveness of his office (Springer to Heady, March 11, 1968). Consequently, during the 1967-1969 period, when the establishment of the Office of the Vice-President for Research and Dean of the Graduate School was being discussed, the functions of the Office of Research and Fellowship Services were re-analyzed to determine what was being done and what could be done to improve research support services on campus.

Insofar as the Office of Research and Fellowship Services was responsible to the new Vice-President for Research and Dean of the Graduate School, its functions were included in the "Proposed Duties and Responsibilities of the Vice-President for Research." They included (1) providing informational services on research opportunities, (2) establishing a data bank on research, (3) issuing a research bulletin listing research proposal deadlines, new contracts and grants awarded and completed, (4) maintaining a central inventory of all current proposals for grants, contracts, and training programs,

(5) conducting occasional seminars for faculty, students, and visitors to discuss research activities, (6) reviewing research proposals and making recommendations for action by the Vice-President and Dean of the Graduate School, (7) assisting the Vice-President in identifying shifts in federal funding policy and coordinating any campus-wide actions deemed necessary and appropriate, and (8) advising and assisting faculty on the technical aspects of proposal and report writing. Collectively, these functions were intended to provide a support "service-function" (Personal interview, Perovich, July 26, 1982) to both faculty and Administration through the Office of the Vice-President for Research and Dean of the Graduate School.

During 1968-1970, the Office of Research and Fellowship Services began to organize around two major areas of responsibility--faculty research support services and support to the Vice-President for Research and Dean of the Graduate School. The Office was perceived during this period as not actively promoting and encouraging faculty research but rather as a low-key, custodial, administrative unit.

Edmund B. Kasner succeeded Harold Walker in 1970. According to Mr. Kasner, the office handled two things: research services and fellowship services. But the Office "was completely disorganized. I had to separate [research services and fellowship services] and concentrage on what was important, and that was research. The fellowships were sort of static at that time and

there wasn't much I could do about it" (Personal interview, Kasner, May 20, 1982). Accordingly, Kasner focused on establishing rapport with the faculty and gaining their confidence through actively promoting and encouraging research and providing research support services. The result was that the number of proposals submitted by faculty members "started to jump almost immediately . . . I think it wasn't just I who did this . . . I think the faculty was looking for something like this" (Personal interview, Kasner, May 20, 1982). The interviews and cocuments indicate that an active outreach program was established, providing the faculty with a library of pertinent information and publications. Mr. Kasner's office also began publishing a bulletin, Research Notes, that informed faculty members of research opportunities, deadlines, and awards:

> I'm not too sure if Research Notes ever really brought . . . directly much research money in. One thing it did do, it let people know that there was an office and it was working on their behalf and that was a big thing. People got upset when they didn't see it (Personal interview, Kasner, May 20, 1982).

In addition, Mr. Kasner began a program of actively representing the University and

> making calls on various agencies and seeing the people that you have to meet by telephone anyway and getting a degree of rapport going there and then you can turn other faculty on . . . It went on from that point . . . it was a marketing-type, salesmanship-type of thing. [And]. . . every time I did go back [to Washington] I always paid a call on the Congressional delegation (Personal interview, Kasner, May 20, 1982)

To a lesser extent, Kasner also initiated and maintained similar contacts with members of the New Mexico State Legislature and State agencies. The interviews and documents indicate that the purpose of this activity was to generate information in support of faculty research as well as to represent the capacilities and image of the University as a research institution.

There was a qualitative shift in the Office of Research and Fellowship Services as a result of this more aggressive manner of carrying out the responsibilities of the director. The interviews and documents indicate that because of the active research support services for faculty members under Kasner, the active representation of the University's research capabilities, and the improved information services, "the first year [1970] had . . . 161 proposals, the next year [1971] we jumped that 76%, and there was never a negative figure after that" (Personal interview, Kasner, May 20, 1982). (See Fig. 2, p. 50.). The faculty responded to the new entrepreneurial and support programs "well . . . The emphasis started to shift in . . . 1970 . . . it worked very well . . . even when there were . . . very, very tight times" (Personal interview, Kasner, May 20, 1982).

During 1972-1975, the University engaged a new Vice-President for Research, a new Director of Research and Fellowship Services, and a new Dean of the Graduate School. It encouraged faculty to increase their participation in sponsored research and established a responsive internal faculty research support system. The data indicate that

the contribution made by both the faculty and the Administration in moving toward identifying the University as a research institution during 1967-1971 were significant. These early developments set the stage for the University's research development efforts in 1972-1978.

Summary

In 1968, some faculty members and individual administrators at the University of New Mexico recognized the need for expanded research support services. Research appeared to be of growing importance to institutional expansion and excellence. Dr. Ferrel Heady became President in 1968 and provided the administrative leadership needed to establish the Office of the Vice-President for Research. The Office was a symbolic statement of the emerging importance of research and graduate education on campus; it enabled the University for the first time to focus on research. The initial efforts of the first Vice-President for Research and Dean of the Graduate School, Dr. Springer, were directed toward defining the role of that Office and providing adequate logistical support and grant information to faculty researchers. The Office of Research Administration and Fellowship Services was developed to provide that support. Several key administrators in the University's central Administration supported the institution's shift in emphasis from faculty teaching toward a combination of teaching and research. They petitioned the New Mexico State Legislature (1) to allow the University to retain a portion of

the overhead charged to research and development contracts and grants for discretionary use, (2) to permit a selective reduction in teaching loads for faculty researchers, and (3) to return overhead to University departments in order to stimulate additional research activities. These requests granted, in 1968 the University succeeded in increasing its faculty research activities during a period when the growth of federal support for research had come to a virtual stand-still.

In 1972, Dr. Paul Silverman became the acting Vice-President for Research. The acting Dean of the Graduate School, Dr. David T. Benedetti, reported directly to Dr. Silverman. This re-structuring had a significant impact on the Office. Silverman established viable faculty research support mechanisms, defined the Office's mission, and concentrated on encouraging and developing sponsored research on campus. The combined efforts of Dr. Silverman and Mr. Kasner established an aggressive, entrepreneurial research development program; this in turn increased the momentum of faculty research. Between 1972-1975, the number of faculty research proposals increased, expenditures for research increased, and the University was listed for the first time (1972-1978) by the National Science Foundation as one of the top one hundred universities and colleges in amount of federal support for research and development. The growth in research activities was accomplished within the context of a nation-wide leveling-off of federal support for university research. The

University of New Mexico's efforts to increase its research activities were clearly successful.

Chapter II

The Development of An Internal Support Structure for Sponsored Research

Introduction

The emergence of the University of New Mexico as an institution that emphasizes research and graduate education is a relatively recent development. The Graduate School was established in 1947 (Personal interview, Travelstead, July 26, 1982), and the first suggestions that the University should establish an Office of Vice-President for Research[1] surfaced in 1968 (Springer to Travelstead, March 11, 1968). The data further suggest that the University was in the nascent stages of development as a research institution between 1967 and 1969, when the Office of Vice-President for Research was established in combination with the position of Dean of the Graduate School. The impetus for establishing that office grew out of a recognition that the institution needed expanded research support services and that emphasizing research was important to institutional growth and excellence.

The emphasis on the importance of research on campus, the support of research activities, and the pursuit of an expanded sponsored research were consistent with the University's mission to add to the store of human knowledge. According to The University of New Mexico Faculty Handbook (1966),

> It is the policy of the University to encourage faculty members to participate in research sponsored by outside agencies when such research is consistent with the basic aims of the University in regards to the education of students, the extension of knowledge,

[1]The term "Vice-President for Research" was used throughout the 1967-1969 discussions among faculty members and administrators leading to the creation of the Office. The term "Vice-President for Research" will be used in the initial part of this chapter. The official term, "Vice-President for Research and Dean of the Graduate School" was used in 1968 when the Office was established and will be used after that event is described. Other changes in the official name of the Office will be noted as appropriate in Chapters II and III.

> and the broadening of man's horizon in the sciences, arts, and humanities (p. 83).

To fulfill the University's responsibility to research, the institution made modifications in its organizational structure, administrative policy, and staff capabilities. More specifically, the University (1) established the Office of Vice-President for Research in combination with the position of Dean of the Graduate School, (2) retained a portion of the overhead generated from sponsored research to support further research activities, (3) advocated the selective reduction of faculty teaching-loads to allow more time for research, and (4) expanded the research-support functions of the Office of Research and Fellowship Services.

The University As A Developing Research Institution, 1967-1968

In 1967 and 1968, the University of New Mexico was viewed by federal granting agencies as a developing institution. Two significant grants intended to assist developing institutions in improving academic quality were awarded to the University of New Mexico during this period. Dr. Julius Blum and the faculty of the Department of Mathematics successfully pursued a National Science Foundation grant to improve the quality of the programs offered by the Department. Dr. Blum worked directly with President Popejoy in this matter. In addition, the University applied for and received funds from Title III of the Higher Education Act of 1965 (P.L. 89-329). The purpose of this Act was to provide support for developing institutions that were outside the mainstream of academic life by maximizing financial and academic benefits to them. However, the data suggest that the

University also served as a sponsor for several institutions that received Title III funds, indicating that the University of New Mexico was not considered to be completely outside the mainstream of academic life. The University of New Mexico was characterized as a "young," maturing institution (Personal interview, Chester Travelstead, July 26, 1982). It had a small number of faculty members and administrators who were aware of the importance of research in improving the quality of instruction, graduate programs, and faculty; they recognized research as a vehicle through which the University could enhance its stature.

Faculty Initiatives and Concerns

The establishment of a more supportive climate for research took several directions: encouraging and facilitating faculty research, providing recognition for research internally and externally, and relieving the burden of work on the Academic Vice-President. These were significant goals that marked the Administration's discussions on establishing the Office of the Vice-President for Research during 1967-1969.

In the years preceding 1968, whenever formal discussions about the establishment of the Office of the Vice-President for Research took place, a number of research faculty members expressed concern about the lack of a positive attitude towards scholarship and research at the University of New Mexico. The data suggest that at this time, "10 to 15% of the faculty, at the most, [were] really concerned about research on campus" (Personal interview, Travelstead, July 26, 1982). This small group of faculty members actively sought to increase research activities on campus (Personal interview, Heady,

July 19, 1982), but it was frustrated by the lack of support and recognition for such activity on campus. It was, however, instrumental in getting the Office of the Vice-President for Research established (Personal interview, Travelstead, July 26, 1982):

> [Their] view about this was an ambiguous one because on the one hand there was a desire for more help from the Administration and more recognition from the Administration for research. But, at the same time, there was some apprehension that this might turn out, in some way, to restrict discretion about research that ought to remain in faculty hands or, at least, at the departmental level rather than at higher levels in the Administration (Personal interview, Heady, July 19, 1982).

Ferrel Heady, who was the Academic Vice-President during this period, noted that although

> the main concern was a concern about facilitation . . . there was some apprehension that went along with that about imposing from above, by the Administration, some form of controls or vetoes over what kinds of research projects would be considered appropriate . . . and [which projects] . . . would be given priority (Personal interview, Heady, July 19, 1982).

The issue of administrative control over research emerged, and many faculty members, including those who supported the establishment of the Office of the Vice-President for Research, were concerned that such an office might impinge on the traditional authority, freedom, and flexibility of departments and individual faculty members to conduct research. Such concerns were duly recognized by University administrators.

"Proper faculty consultation" (Springer to Travelstead, January 12, 1969) was recognized as essential in the policy-making process. Formal provision was made for the faculty to

> share in the formulation of policy for research and in decision making concerning research carried out at the University. It was not felt that he [the Vice-President for Research] should individually or unilaterally set such policy himself, but yet could and would be responsible for policing policies adopted. (Summary of Discussions on Responsibilities of the Vice President for Research, UNM, August 12, 1968, p. 5)

Administrative Initiatives and Concerns

Dr. Travelstead noted that establishing the Office of the Vice-President for Research was fraught with some difficulty, since

> this institution, as young as it was . . . that whole thing [faculty research support] hadn't been addressed as well as it had been in more mature institutions that [were] established, that had graduate programs and research for a long while . . . [i]t was a natural step (Personal interview, Travelstead, July 26, 1982).

Support from "a mature institution", however, was available in the experienced person of Dr. Heady, the Academic Vice-President and President-elect. Dr. Travelstead observed,

> I think Dr. Heady's introduction to this institution had a good deal to do with [the establishment of the Office of the Vice-President for Research]. He came from a powerful and great institution, the University of Michigan, where he had been for twenty years and where a lot of these things were taken for granted for a long while. And, I'm sure, when he came here he wasn't aware at first of how little of that [support for research] had been done . . . and before he went into office as President he took this step as an effort to give direction and emphasis to something [research] that he thought was important for an institution that hopes to be a great university. (Personal interview, Travelstead, July 26, 1982)

According to Heady,

> one of the reasons for advocating a Vice-President for Research was that this would be an indication of more

> recognition about the importance of research. It would encourage more faculty members to be more active in research and it would be a way of giving recognition for faculty members and departments that had good reputations as researchers (Personal interview, Heady, July 19, 1982).

In addition to these advantages, having a Vice-President for Research --"a person devoting his exclusive effort to that"--would be important evidence "in the eyes of a lot of people" that the University was placing greater emphasis and importance on research, as would the title of Vice-President (Personal interview, Perovich, July 26, 1982):

> [I]did say, among other things, to other institutions, that we were, in our evolution and growth, trying to recognize and do more in the whole area of research. . . it helped the image of this institution, the fact that [we were] . . . putting this institution on the line as being interested in and more supportive of research than it had been before (Personal interview, Travelstead, July 26, 1982).

Dr. Heady noted that "the motivation was that if we organized properly and staffed up properly and got the word out throughout the University . . . [the] result may be that we could obtain a larger share of whatever research support may be available" (Personal interview, Heady, July 19, 1982).

There was, however, a shared concern among some faculty members and individual administrators that the University "didn't have the machinery in place so that grant requests could be processed expeditiously and track could be kept of research funds as they were being spent, what overhead was generated and what happened to it" (Personal interview, Heady, July 19, 1982).

The data indicate that several key University administrators--Dr. Heady, Mr. Perovich, and Dr. Travelstead--were aware of the need of the institution to "formulate campus research policies and oper-

ating principles [as well as provide] central information and logistical support-functions for grant applications" (Springer to Heady, March 11, 1968).

The Office of Research and Fellowship Services was an early effort to get the University's research management "machinery" in place. It was an organizational sub-unit intended to provide support services to faculty researchers and to provide management services to the institution. Harold Walker became the Director of Research and Fellowship Services in 1957 and was, according to Perovich,

> the first person we [had] . . . the purpose of his office was to . . . review proposals, assist in preparing proposals, catalog them, determine if this was an appropriate [research activity] of the University to get into, be sure that budgets were properly prepared, that it was adequately funded, to review the proposal to see that we could do what we were committed to do and, if there were any major difficulties involved with the proposal, we would submit that, in those days, to the Academic Vice-President [to] get it resolved (Personal interview, Perovich, July 26, 1982.

Dr. Springer noted that Harold Walker had a difficult time in fulfilling expectations established for the office because "he was brought here without proper faculty consultation in 1957, was left unsupported by the University Research Committee, and lacked clear-cut backing from the very top" (Springer to Heady, March 11, 1968). Too, there was "a little bit of a hands-off attitude about cooperating with him" (Personal interview, Heady, July 19, 1982). Dr. George Springer noted that the Office of Research and Fellowship Services provided "inadequate informational and logistical support" (Springer to Heady, March 11, 1968) to faculty researchers. Discussions concerning the establishment of the Office of the Vice-President for

Research held among Dr. Heady, Mr. Perovich, and Dr. Travelstead during the 1967-1969 period focused on the need to "beef up" the Office of Research and Fellowship Services as well as to institute other administrative procedures that would complement the work of that office in monitoring individual faculty research proposals (Personal interview, Heady, July 19, 1982). Dr. Travelstead noted that

> the whole matter of cost-sharing and indirect costs was a very nasty question over a period of years because we'd find, until we set up this Cost-Sharing Committee, that people would make a proposal and get some money. We wouldn't know until after the fact what the commitment the University was making in space or in matching money . . he guidelines and the supervision of had not been put in place well enough . . .[W]e found that before we put this in place, people were saying the University could furnish space, this, that, and the other, and it went on to Washington and here we were, caught not being able to do a lot of that (Personal interview, Travelstead, July 26, 1982).

During the early 1967-1968 period, the University, in moving towards the establishment of the Office of Vice-President for Research, made perceptible shifts both in the way it viewed itself internally and the way it wanted to be viewed externally. The data suggest this shift was functional, for it reduced the work-load on the Academic Vice-President and focused attention on research. It was a symbolic step in the maturation of the institution.

In sum, several important factors contributed to the favorable disposition of members of the faculty and Administration towards the establishment of the Office of the Vice-President for Research. These were (1) the need to reduce the work-load of the Academic Vice-President, (2) the need to have a Vice-President who could concentrate

on promoting and facilitating campus research, (3) the need to develop support services to encourage and facilitiate faculty research, (4) the need to establish an internal administrative proposal-review mechanism, (5) the need for a grant-evaluation and reporting mechanism, and (6) the need to utilize research as an index for evaluating the University's performance and through which to forge a great institution.

Administrative Support for Faculty Research

Several key people in the University's central Administration supported the institution's shift from an undergraduate teaching institution towards a research institution. The data indicate that throughout the period 1968-1978, the Administration pursued two significant avenues of support for faculty research: advocating to the New Mexico State legislature that (1) the University retain a portion of the overhead charged to grants and contracts, which at the time was instead credited to the general budget, and (2) reduction in teaching loads be granted to selected faculty members engaged in research at the University. The overhead issue emerged early and was never fully resolved. Dr. George P. Springer noted that

> Every week the question of overhead seems to become more pressing . . . at the very least there are some misconceptions rampant in the present fate of the 'overhead.' This I suspect is the result of our tradition of budgetary hocus-pocus . . . I feel that if we appoint a FRAC [Faculty Research Allocation Committee] one of the early jobs would be to study this problem. I suspect that they'd do it with considerable zest, and that the outcome would be highly instructive; namely, that the amount of disposable overhead (that left after you've covered your real indirect costs) is quite small (Springer to Travelstead, January 2, 1969).

Perovich notes that the total costs incurred by the University in conducting research, development, and demonstration (RD&D) activities in all indirect categories were real ones borne by the institution. However, the manner in which the University internally re-allocated money generated from overhead left some overhead that was not immediately encumbered. This gave many people the mistaken impression that there was an actual surplus rather than a mere temporary ability to use these funds for other purposes (Personal interview, Perovich, March 15, 1983). Heady notes that the total overhead attributable to grants and contracts was an amount of money that "became available for whatever use the administration thought could be best made of it. And that, presumably, was in the hands of President Popejoy and the Vice-President for Business and Finance" (Personal interview, Heady, July 19, 1982). Two related questions of research support and utilization of overhead money were raised during the 1968-1969 period: (1) should the Vice-President for Research be involved in decisions about how the University allocates its overhead funds for the purposes of research, service, and capital outlay, other than major capital outlay for new buildings? and (2) should the Vice-President for Research work closely with the Academic Vice-President and the Vice-President for Business and Finance to resolve the budgetary aspects of research activities on campus? Dr. Travelstead noted that the Academic Vice-President and the Vice-President for Research should study the matter of generation and distribution of indirect costs and overhead ("Summary of Discussions Concerning Newly Created Position of Vice Presidency for Research," UNM, 1968). John Perovich noted that if

there were a return of overhead to departments, it could serve to stimulate more research. He observed that

> The Administration recognized that there were a lot of costs associated with the seeking of federal funds you just couldn't budget through your normal budgeting process . . . this [return on overhead] would permit some flexibility in those departments or Colleges in proposal writing, to support proposal writing . . . the intent was that [it be used as] . . . seed money, and the department could use it any way they wanted. They could use it for travel, give papers, or however they felt it best enhanced the department (Personal interview, Perovich, July 16, 1982).

The Administration recognized that research activities needed to be supported through the use of surplus overhead funds. During 1969, it successfully petititioned the New Mexico State Legislature for a means by which it could retain a greater portion of its overhead to support research. The University proposed that rather than credit the total amount of overhead generated by contracts and grants, that it instead credit only 50% of the overhead to the general budget. The remaining 50% of the funds would be used as the University wished. It won approval of this proposal. Later, the University approached the Legislature with another proposal to increase its discretionary percentage of the overhead, and in the early 1970s, the "rule was changed from a 50-50% split . . . [with the University]. . . taking credit for 20% of the overhead in the general budget and 80% would be returned" (Personal interview, Roberts, June 29, 1982) to the institution. These funds were viewed as "seed money" (Personal interview, Perovich, July 26, 1982) to encourage, promote, and support research and public services and to provide the Administration with contingency funds. Dr. Heady noted that during 1969 the three Vice-Presidents reviewed options for using the overhead. Their recommen-

dations were subsequently discussed in the President's weekly meeting with all the Vice-Presidents. Some faculty members pressed the University's administrators to return a portion of the overhead to the departments that generated it. That "claim" to a portion of the overhead led to the establishment of an allocation formula that assumed 10-15% would be returned to the generating department. The remaining funds were distributed on a University-wide basis so that potentially productive research departments could "bolster up research activities in the University" (Personal interview, Heady, July 19, 1982).

While faculty members were encouraged to pursue research more aggressively, the Administration realized that it also had to provide additional resources either in time or dollars. Some individual adminstrators were sensitive to the need to go beyond "some nice statements" (Personal interview, Travelstead, July 26, 1982) recommending that faculty members should do more research. They recognized the need to selectively provide research faculty more time to conduct research. When the pursuit of research "got caught up in the question . . . of promotion, rank, and publication" (Personal interview, Travelstead, July 26, 1982), it became important for the Administration to support research by moving towards reduced teaching loads for selected faculty members engaged in research. Dr. Travelstead notes that "in order [for the institution] to justify the money [it was] getting from the state, [the faculty] must carry sufficient student teaching loads, about which there has been argument all along" (Personal interview, Travelstead, July 26, 1982). This, like the need to approach the Legislature concerning the matter of overhead, was a necessary and important step in the support of research. Dr. Travelstead observed

that

> It has been particularly hard for this institution . . . more than any other institutions across the country to get out of that restriction of producing student credit hours, teaching people to get jobs. I'm talking about the view of the Legislature in the State over the years . . . and they . . . generalized . . . well . . . what do they want to do research for? . . . We need to teach our kids more of what we already know (Personal interview, Travelstead, July 26, 1982).

Although the Administration was aware of how difficult it would be to get the New Mexico State Legislature to approve reduction in faculty teaching loads for researchers, it defined this goal as a significant factor in establishing a more supportive climate for research. Mr. Perovich noted that the

> [r]eduction in teaching load itself [was] a support of research. I think [that in] the late 1950s and early 1960s . . . our teaching loads were much higher than they were in the late 1960s and early 1970s. Getting a bigger reduction in load for people who were on research was another indication of the Administration's commitment to support the shift in emphasis towards increasing faculty research activities . . . I think it's one way that an institution can support research. If a person has a full teaching load and committee assignments . . . they really don't have much time [to conduct research]. . . . [A] reduction in teaching load is a way you can place a bigger emphasis on research (Personal interview, Perovich, July 26, 1982).

The New Mexico State Legislature, when approached with the Administration's proposal to reduce teaching loads for faculty engaged in research, "questioned it . . . That's one measure they always use . . . how many courses are you teaching and what are you doing with your time?" (Personal interview, Perovich, July 26, 1982). Fortunately, the Administration was successful in getting teaching loads at the University reduced.

The Administration's support for the institution's shift toward faculty research and enhanced stature through research manifested itself in two significant ways: (1) successful advocacy in the New Mexico State Legislature for an increase in the University's retention and use of overhead; these funds could now support research that would not be charged against the institution's general budget; and (2) successful advocacy in the New Mexico State Legislature for reducing research faculty members' teaching loads.

Establishment of the Office of Vice-President for Research and Dean of the Graduate School

During 1967-1969, the establishment of the Office of the Vice-President for Research and its combination with the position of Dean of the Graduate School was discussed extensively among University administrators. Responsibilities for that office were proposed and a tentative decision made to create the combined office. According to Dr. Heady, the idea of establishing the Office of the Vice-President "had really been adopted, in principle, before I became President. And then there was a long period of negotiation and working out the details" (Personal interview, Heady, July 19, 1982). Defining the duties and responsibilities was a long-term objective in establishing the Office of the Vice-President for Research: "The President-elect [Ferrel Heady] has decided that these functions should be developed and defined gradually and in consultation with those primarily concerned" (Travelstead to Adams, June 17, 1968).

In early 1968, President-elect Heady approached George Springer, the Dean of the Graduate School, about serving as the new Vice-President for Research as well as remaining Dean of the Graduate School. Dr. Springer wrote to Dr. Heady:

> I was greatly pleased by your recent suggestion that I take on the management of sponsored research in addition to the graduate deanship. In the last ten days I have given this much thought . . . and have a clearer notion of opportunities and problems . . . I will gladly accept this added responsibility given reasonable assurance that by taking it on, I don't jeopardize the continued qualitative growth of the graduate school, [and] my generally good relationships with faculty and administration . . . To obtain this assurance, the first thing you and I must agree upon is the definition of the job itself . . .[T]his is particularly crucial and should be defined with . . . proper faculty consultation (Springer to Heady, March 11, 1968).

The documents and interview data indicate that between March and August, 1968, the duties and responsibilities of the Vice-President for Research and Dean of the Graduate School were discussed, proposals and reactions evaluated, and a tentative job-description for the office formulated.

The definition of the duties and responsibilities for the Office of the Vice-President for Research and Dean of the Graduate School involved both creating a new office and separating functions previously handled by the Academic Vice-President. In a memo to Clinton Adams, Dean of the College of Fine Arts, Dr. Travelstead noted that there were two principal considerations to be addressed: (1) better consideration and more effective coordination of research activities, and (2) alleviation of the rather unwieldy load now carried by the Office of the Academic Vice-President. Dr. Travelstead

continued by observing:

> The position of the Vice-President for Research is justified only if it facilitates, expedites, and helps to improve policies, procedures, and other aspects of research . . . [and that] . . . it should be of service to administrative officers, including academic deans, department chairmen, and faculty members involved [in] research (Travelstead to Adams, June 17, 1968).

In analyzing the functions of the Office of Vice-President for Research and Dean of the Graduate School, Dr. Travelstead observed that these functions could be broken down into six principal areas: (1) informational, (2) representational, (3) managerial, (4) developmental, (5) financing research administration, and (6) research policy, including policies relating to the conduct of research, such as patents, consultation, conflict of interest, and use of human and animal subjects (Travelstead to Adams, June 17, 1968).

Travelstead felt keenly that existing systems, the responsibility for which lay with the Director of Research and Fellowship Services, had not been effective in creating usable informational service. Information services did not serve the whole campus and, according to Travelstead, "[t]he only central inventory . . . of all grants and proposals can be found in the Comptroller's office. Advertising of opportunities is done on a selective basis and follow-up is weak" (Travelstead to Adams, June 17, 1968).

The goal of more effective representation was to create higher and more consistent visibility for the University through the designation of a single University official to attend scientific meetings, government research and policy briefings, and professional meetings of research administrators. Travelstead suggested that the institution

should have the same individual actively participate in State, regional, and national organizations, including the New Mexico Governor's Science Advisory Board, Associated Western Universities, Western Interstate Commission on Higher Education, the National Council of University Research Administrators, and the National Association of State Universities and Land Grant Colleges.

More effective managerial functioning would improve the performance of the multi-disciplinary research and public-service organizations on the University campus. These organizational sub-units included the Bureau of Engineering Research, the Civil Engineering Research Facility, "The Shock Tube," and the new Institute for Social Research and Development, all of which required "budget review, operating report review, participation in the selection of professional personnel, salary review, billing, book-keeping, [and] accounting" (Travelstead to Adams, June 17, 1968). To compound each of these managerial challenges, each organizational sub-unit had different organizational structures, reporting patterns, and operational procedures.

Increased effectiveness in the University's developmental functions would include proposal-writing, editing, and report-writing; from the perspective of the Office of the Vice-President for Research and Dean of the Graduate School, it should also include actively soliciting research grants and contracts. How such developmental functions should be performed, e.g., by individual faculty members, by Colleges, centrally, or by some other mix that would benefit both the institution and the individual researchers, received serious attention.

The question of financing research administrators with respect to the new Office of the Vice-President for Research and Dean of the Graduate School was also reviewed. Among other things, it involved determining (1) whether or not a policy on indirect costs should be established, (2) what incentives to faculty could be provided to encourage, support, and manage research more effectively, and (3) how a formula could be designed to re-distribute overhead in support of the new Vice-President for Research and Dean of the Graduate School, the departments, and individual researchers on campus.

The most critical area, however, involved establishing research policy. Existing research policy was described by Dr. Travelstead as "laissez-faire": "individual members of the faculty or groups decided on their own research grant, contract sponsorship, and the interpretation of sponsor regulations" (Personal interview, Travelstead, July 16, 1982). Dr. Travelstead felt that the development of an overall research policy was an important function of the Vice-President for Research and Dean of the Graduate School.

Two meetings were held in June and July, 1968, for the purpose of discussing how the responsibilities of the Academic Vice-President and the Vice-President for Research and Dean of the Graduate School differed and coincided and how they might be characterized to the campus community. The data indicate that once these questions and issues were identified, possible solutions could be determined, but only after reviewing the suggestions of other administrative officers. The results of continued discussions and refinements were forthcoming in a draft report titled "Proposed Duties and Responsibilities of the Vice-President for Research," UNM, March 25, 1969. This

draft described the duties and responsibilities of the Office in six major areas.

In that document, the Vice-President for Research and Dean of the Graduate School was viewed primarily by individuals in the Administration as an administrative officer reporting directly to the President. A Joint Research Advisory Board was proposed to assist the new Vice-President as well as the Academic Vice-President whenever they were to consider policies and major decisions concerning research. The Vice-President for Research and Dean of the Graduate School was to be responsible for coordinating and implementing the policies and procedures approved by the Board and subsequently approved by the President's Council of Vice-Presidents. Responsibilities of the Vice-President for Research and Dean of the Graduate School were described as being primary, shared, and advisory.

The primary responsibilities of the Vice-President for Research and Dean of the Graduate School were to assume initiative and responsibility for disseminating information about research activities, maintaining data on sponsored research, and reviewing proposals recommended by academic deans and chairs of departments.

The shared responsibility of the Vice-President for Research and Dean of the Graduate School was to serve on several advisory committees. The Vice-President would, as a member of a group consisting of the other Vice-Presidents, advise the President, work with the Joint Research Advisory Board in formulating research policy and decision-making, and act as the principal coordinating agent of institutional (as opposed to faculty) research contracts with outside agencies. In addition, the Vice-President for Research and Dean of the Graduate School would be responsibile for supervising and

coordinating campus-wide responses to major shifts in federal funding policies. Although the central Administration would be finally responsible for this activity, the coordination and implementation of policy shifts would be handled by the Vice-President for Research and Dean of the Graduate School.

The advisory responsibility of the new Dean was (1) to apprise the President and Vice-Presidential Advisory Board of actions taken by the Joint Research Advisory Board, (2) to advise the Academic Vice-President and the academic deans of actions involving research policy and decisions on campus, (3) to advise department chairs and faculty concerning individual and cooperative research opportunities, and (4) to advise and recommend improvements in existing overhead policies and procedures to the Academic Vice-President and the Vice-President for Business and Finance.

Although the duties and responsibilities of the Vice-President for Research and Dean of the Graduate School were tentatively agreed upon, the necessary process of refinement continued into the mid-1970s. Dr. Travelstead noted that

> there was so much argument for a year or two after the Office was established [1969] that for a while I would say the impact was more negative than positive [in encouraging and supporting research]. . . . And this wasn't George Springer's fault. [There was] . . . so much argument about the thing being established without preparation on the part of the faculty . . . faculty input about the Office and what it would do . . . [that more attention was paid to defining the Office than actively developing research support] (Personal interview, Travelstead, July 26, 1982).

The faculty's principal concern following the establishment of the Office was faculty representation. George Springer realized the

importance of faculty support of the Office of the Vice-President and Dean of the Graduate School lest faculty members "block progress" (Springer to Travelstead, January 2, 1969). Faculty would need to be included in shaping research policy and decisions.

The need was very real. In 1969, an Ad Hoc committee composed of Professors B. Albrecht, J. R. Blum, R. N. Castle, E. F. Cruft, H. Ellis, V. Regener, J. V. Scaletti, and R. Tonigan had issued "The Report of the Ad Hoc Faculty Committee on the Functions of the Office of the Vice President for Research." The report agreed with several key members of the Administration in recognizing that an Office for Research Administration should be maintained to keep the faculty informed of research opportunities and to encourage it to engage in research. In addition, the report agreed with key members of the University's administration that the Office of Research Administration and Fellowship Services should be under the Vice-President for Research and Dean of the Graduate School. Members of the faculty and Administration also concurred in pointing to an area in which research could "fruitfully relate to the reward system and to the maintenance of quality in faculty recruitment, promotion and tenure decisions" (Springer to Travelstead, January 2, 1969). However, the report differed with the Administration's position on the role of the faculty in establishing University research policy.

The major difference between the Ad Hoc faculty group's proposal and the one being developed by Drs. Travelstead and Springer was in their definition of the role that the committee would play. Drs. Travelstead and Springer thought that this committee would be "a joint research policy board whereas the faculty wants to have it as a policy-making body . . . the major issue, really, is how much power

that committee will have" (Springer to Heady, April 23, 1969). Dr. Springer observed that the advisory committee would be an important element in ensuring the viability of the Office of the Vice-President for Research and Dean of the Graduate School through maintaining communication between Administration and faculty. The Vice-President would need the advice and support of the faculty in making research policy-decisions. Dr. Springer also stressed his belief

> that the ultimate decision as to the functions and duties of any administrative officer [is] vested in the President. Having obtained all the advice he can, he and he alone should reserve the right to make that sort of decision (Springer to Heady, April 23, 1969).

Dr. Springer took a strong position in support of faculty representation on a policy advisory committee, basing his position on previous faculty opposition to lack of cooperation with the former Director of the Office of Research and Fellowship Services. Such opposition had compromised the Director's effectiveness. Other important considerations included the success of the faculty Graduate Committee, the need to give the faculty a real voice in research policy, and the need to prevent any faculty attempts to block progress in the development of the Office of the Vice-President for Research and Dean of the Graduate School.

A Joint Research Advisory Board composed of faculty members and deans, the Vice-President for Research and Dean of the Graduate School, and the Academic Vice-President was established in the spring of 1969 to assist the Vice-President for Research and Dean of the Graduate School in formulating policy and making decisions about research at the University. The data indicate that although not all the recom-

mendations of the Ad Hoc Faculty Committee were adopted, there was sufficient common ground for the faculty and the Administration to establish a working relationship.

Some measure of dissatisfaction with the dual administrative roles held by Dr. Springer remained among the faculty. While Springer was respected as Graduate Dean, "the dean's task . . . filled most of his time" (Personal interview, Silverman, March 24, 1982), and his understanding of the function of the Office of the Vice-President for Research within his combined position did not appear to be clear to him (Logan to Heady, August 1,, 1972).

In the summer of 1972, Dr. George Springer died. He was succeeded as the acting Vice-President for Research[2] by Dr. Charles Beckel, who served for approximately one year. When the two administrative positions were separated, Dr. Benedetti became the acting Dean of the Graduate School. Dr. Beckel had a good grasp of the importance of research to the University and "supported that [move] 100%" (Personal interview, Kasner, May 20, 1982). However, as Travelstead noted, Dr. Beckel, as an interim appointee, didn't have enough time in the Office to substantially shape its direction or operations (Personal interview, Travelstead, July 26, 1982). L. E. Roberts notes that during this period these "acting people, for all intents and purposes, really didn't understand what the office was supposed to do" (Personal interview, Roberts, June 29, 1982).

Several active members of the faculty research community felt that finding a replacement for Dr. Springer presented the Administration "both with an opportunity and a challenge" (Blum to Heady, August 8, 1972). Dr. Blum stated:

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[2]When the Office of the Vice-President for Research and Dean of the Graduate School were separated, the official name of the Office changed to the Office of the Vice-President for Research.

> I think a great deal of additional research money as well as considerable improvement in the research climate on campus could be achieved by the right person. Such a person should be an experienced researcher, well respected in Washington as well as by his colleagues (Blum to Heady, August 8, 1972).

Dr. Needler, in a memo to Dr. Heady, suggested that the two positions be separated and that the University fill the position of the Vice-President for Research with

> someone who is at home in the world of foundation grants and federal contracts and can devote time and energy to organizing the nexus between scholarly activity at the University and funds available outside. I would urge that some effort be taken in filling this position with someone who has the stature and capability to play a major leadership role (Needler to Heady, August 9, 1972).

The Faculty Ad Hoc Committee expressed similar sentiments, advocating the separation of the dual administrative position of Vice-President for Research and Dean of the Graduate School. Dr. Logan agreed:

> First, every effort must be made to divorce the positions of Vice-President for Research and Dean of the Graduate School. Particularly at this juncture in the development of the University, the separate functions should be defined and staffed separately (Logan to Heady, August 11, 1972).

The change came with the appointment in 1974 of Dr. Bernard Spolsky as new Dean of the Graduate School. He was to report to the Vice-President for Research and Graduate Affairs.[3] This separation ennabled the newly-appointed Vice-President, Dr. Paul Silverman, to focus more actively on the development of sponsored research on campus.

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[3]The official name of the Office changed in 1974 from the Vice-President for Research to the Vice-President for Research and Graduate Affairs.

Chapter III

Methodology

The dynamic process through which an institution of higher education responds to change in its external environment and develops from an undergraduate teaching institution in the direction of a graduate research university is not well understood. The literature on institutional adaptation to external environmental change is essentially atheoretical in nature and contains little work designed to test theories describing the dynamics of the change process (Giaquinta, 1973, p. 178).

This study of the University of New Mexico's response to change in its external environment and its development in the direction of a research institution during a "bounded" period of time, 1967-1978, is directed towards developing a set of naturalistic generalizations and a building theory rather than towards affirming a prevailing theory. The significance of discovering theory from data, the generation of hypotheses, "grounded theory" (Glaser and Strauss, 1967), lies in the researcher's ability to arrive at "relevant predictions, explanations, interpretations and applications" (p. 1) that are both empirically sound and singularly pertinent to the phenomenon under study. The unit of study of this ethnohistorical investigation (Schumacher, 1972) is the University of New Mexico.

Rationale

The choice of research methodology is determined by the nature of the problem under investigation (Schumacher, 1972; Lofland, 1971). This study of how an institution of higher education adapted to

changes in its external research-support environment employs a methodology that recognizes that the actions of participants, "relationships and events occurring over time . . . need to be examined holistically and in their natural setting" (Higbie, 1981, p. 44). Filstead (1979) has noted that

> Qualitative methodology refers to those research strategies . . . which allow the researcher to obtain first-hand knowledge about the empirical social world in question. Qualitative methodology allows the researcher to get close to the data, thereby developing the analytical, conceptual, and categorical components of explanation from the data itself (p. 33).

The perspective through which knowledge and understanding are developed here is principally one of inductive analysis, beginning from the specific events and moving through generalizations towards broader contexts and applications:

> One begins not with models, hypotheses, or theorems but rather the understandings of frequently minute episodes or interactions that are examined for broader patterns and processes. It is from an interpretation of the world through the perspective of the subjects that reality, meaning, and behavior are analyzed (Rist, 1982, p. v).

A field-study approach provides a flexible means through which the multi-faceted aspects of a university's response to external environmental change can be examined comprehensively (Babbie, 1979). Studies of complex organizations often employ field-research methods, which include what Iannaccone (1975) describes as

> a pattern of activities which consist of a reiterative cycle of sequentially collecting data, analyzing it to develop crude hypotheses which guide the next stage of data gathering, collecting additional data, reanalysis, and further hypothesis development, and rechecking with additional data collection followed by continued reanalysis (p. 222).

The utilization of the field-study methodology and case-studies in the examination of adaptation and change of complex organizations to their environment is not without precedent (Baldridge and Deal, 1975; Emery and Trist, 1965; Herriot and Gross, 1979; Levine, 1980; Martorana and Kuhns, 1975; Miles, 1964; Smith and Keith, 1971). Investigators who have used field-study methodology and case-studies in the examination of various phenomena in higher education include Gross and Brambsch, 1968; Fioke, 1981; Greely, 1967; Higbie, 1981; Pace, 1974, and Paltridge, Hurst and Morgan, 1973.

The importance of university participation nationwide in the conduct of research has been well-documented in the literature (Finn, 1978; Hornig, 1966; Kidd, 1959; Klopsteg, 1959; Orlans, 1962, and Smith and Karlesky, 1977). However, virtually nothing exists in the literature concerning how institutions of higher education adapt to changes or how they develop in the direction of research institutions during periods when federal support for research becomes unstable and competition for funds increases.

It is well-known that the shape and direction of scientific research have become important parts of the public enterprise; they are symbiotically and directly related to the research capabilities of the nation's universities and the federal government's ability to meet national needs. The federal government depends heavily on the strength of the nation's system of higher education and its research capabilities. In turn, researchers and universities rely heavily on the federal government to sustain their research and scholarship. Academic decision-makers and those directly involved in supporting research need "models for predicting the consequences of their actions" (Higbie, 1981, p. 45): a better understanding of how institutions

respond to changes in their external research-support environment, and how the dynamic process of a university developing towards a research institution occurs.

A comprehensive, flexible field-study approach seems appropriate to the purposes of such a study. It can create a better understanding of the process of institutional responses to the phenomena under study. The ethnohistorical field-study approach is a powerful way to understand the phenomenon of organizational change and development from the perspective of the participants. It unfolds the meaning of what is important to the participants from within the setting. Through such an approach, based on informal interviews and document analysis, a deep, rich understanding of the phenomenon of institution responses can be obtained.

Conceptual Framework

An important functional characteristic of the field-study method is a preliminary review of relevant literature. This review of literature is used here to establish an initial conceptual framework to guide the study.

The conceptual framework initially selected was developed from the work of Katz and Kahn (1978) on internal regulation of organizational structures and environmental relationships in the study of organizations. Additional concepts are derived from the research of McCauley (1963) on the internal regulation of organizational structures and the control of the external environment by extending its boundaries, and from the work of Emery and Trist (1965) on understanding the competition for resources in an unstable environment

and the formation of relationships like consortia. These authors helped establish the initial focus of the study and provided the "foreshadowed notions" (Malinowski, 1922) that guided the preliminary data collection and analysis. A more in-depth review of the literature, pertinent to each area being investigated and guided by the emerging data, proceeded concurrently with the field-research. The results of these literature reviews have been integrated with the data analysis and the generation of "grounded theory" (Glaser and Strauss, 1967) in Chapter IV of this study.

Data Collection

In utilizing qualitative research methodology for the study of organizations, it is important to employ a wide variety of data-collection techniques to ensure the flexibility necessary to gathering relevant data (Glaser and Strauss, 1967) and to assuring the validity and reliability of those data. The nature of the phenomenon under study lent itself to using the ethnohistorical approach described by Schumacher (1972) and Smith (1978). This approach focuses on "the accumulation of evidence about events in the past and their subsequent interpretation by the participants as part of a larger phenomenon" (Higbie, 1981, p. 47). The ethnohistorian attempts to go beyond the 'official' description of events and to include personal recollections, anecdotes, and quotations in an attempt to develop a vivid, provocatively-rich account of events. To accomplish this goal, a combination of qualitative research techniques commonly associated with the participant-observation approach (McCall and Simmons, 1969) was employed. By analyzing documents such as memoranda, desk logs, letters, written reports, telegrams, minutes of

board meetings, and proposals, explicit knowledge was obtained and organized into a longitudinal, historical record that chronicled events leading to the University and the consortium-organization during a bounded period of time. Through informal interviews, the researcher obtained additional explicit information and "tacit knowledge" (Polyani, 1958) about those pre-verbal understandings of intutive experiential conceptions of events pertinent to the research effort. Prior personal participation in the formation of the Western Regional Scientific Laboratory, Inc., at the University of New Mexico and involvement in a preliminary study of related organizational changes made it possible for the researcher to obtain project documents, to gain access to key individuals associated with the institution and with the formation of the consortium, and to gain deeper insights into the nature of the phenomenon under investigation. The author spent seven months, the formative period of the consortium in 1976-1977, participating in activities as a member of a special staff brought together by member-institutions of the Intermountain University Research Administrators, under the direction of Dr. Paul Silverman, then Vice-President for Research and Graduate Affairs at the University of New Mexico. The objective of the staff was to assist IMURA and Dr. Silverman in establishing the Western Regional Scientific Laboratory, Inc., a consortium of Rocky Mountain and High Plains universities, and in researching and preparing a proposal for this consortium to manage the Los Alamos Scientific Laboratory when its contract with the University of California, Berkeley, expired in October, 1977. In addition, this author began the deliberate collection of project documents during the conduct of earlier preliminary studies. The first effort began in June and concluded in October, 1978.

The second pilot project began in January and concluded in May, 1981. The process of document collection continued throughout the present study, which was initiated in January and concluded in July, 1982. During these combined research periods, the author spent a substantial amount of time in the "field" at the University of New Mexico and at several other locations in Albuquerque, New Mexico, Denver, Colorado, and Orono, Maine, interviewing individuals and reviewing documents that were pertinent to the study.

Through this approach, which is described by Smith and Pohland (1972) as a "multi-method, multi-person, multi-situation, multi-variable matrix" (p. 11), opportunities became available to follow Iannaccone's "reiterative cycle" of definition (1975), data-collection, analysis and examination of concepts, and subsequent redefinition as need emerged from the data generated by this "disciplined inquiry" (Cronbach and Suppes, 1969).

A total of 1,742 pages of historically relevant documents were collected from the files of the University of New Mexico, the Western Regional Scientific Laboratory, Inc., and participants during the seventeen-month period when this study was conducted. File materials relating to the establishment of the Western Regional Scientific Laboratory, Inc., and the activities surrounding the preparation and submission of management proposals were provided by the Director and Assistant Director of Research Administration, the Secretary of the University of New Mexico, the former Vice-President for Research and Graduate Affiars, the former Project Director and Executive Secretary of the WRSL, Inc., the former Assistant Project Director of the WRSL, Inc., and the Associate Director of the Institute for Applied Research Services.

In addition, newspaper accounts, journal articles, and press releases concerning the establishment of WRSL, the preparation of the proposal, the activities of the University, and the responses of the Los Alamos Scientific Laboratory and the U. S. Energy Research and Development Administration to the WRSL were obtained from the files of the University of New Mexico. These were used to reconstruct the historical events under study.

These relevant historical documents proved to be a provocative source of information. The quantity of paper generated by the organization was as valuable as it was large. Its records provided the author with an additional avenue by which to observe how people posture, present, defend, react to, and initiate action inside the organization. Useful insights and corroborative data were obtained from this extensive paper trail. These documents were placed in chronological order, reviewed, analyzed, and coded for future access while they were being collected. Based on these documents and upon personal knowledge of the people and events described, a list of participants was prepared and interviews scheduled.

A total of ten individuals[1] was informally interviewed by the author. Each person interviewed gave written consent for use of the interview and data collected. These were to be used in the descriptive narrative of how the University of New Mexico adapted to changes in its environment and developed in the direction of a research institution. The interviews were intended to be directed but of moderate length. The moderately-scheduled interview was des-

[1]Dr. William Davis, President of the University of New Mexico, declined to be interviewed, inasmuch as he was about to become Chancellor of the University System of the State of Oregon; time during his remaining tenure at the University of New Mexico was both short and in great demand.

cribed by Stewart and Cash (1974) as containing "the major questions to be asked and possible probing questions under each major question." In addition, they observe, "[t]he moderately-scheduled interview does impose a degree of structure on the interview, forces a higher level of preparation, is easier to replicate and record answers, and is easier for an unskilled interviewer to conduct" (p. 81). The interviews were scheduled to last approximately two hours. This period of time was found to be of sufficient length to provide for unhurried "good conversation" (Rist, 1982, p. 8), during which time the author and the participant could explore a topic adequately. In instances where more than two hours were anticipated or found necessary, several interviews were planned or follow-up interviews were arranged. Each interview was tape-recorded and transcribed. Comments made by the author were taken in note-form and filed. When appropriate, additional comments were recorded on the transcriptions of the interviews. The interview-data were also analyzed and coded for access as they were transcribed. A number of new categories and redefinitions of categories emerged, expanding the author's perspective on the phenomena that were initially believed to be significant.

In most qualitative studies, it is common practice to mask the identity of persons and places when developing the descriptive narrative. Rist (1982) notes that masking "becomes difficult as too much data is supplied" (p. 10) about people, events, and places. Moreover, a substantial amount of information concerning the background and setting of the study is customarily provided in a credible ethnographic study. Such information enables a determined individual to identify the research location. For all these reasons, in this study

the author elected not to mask the identities of individuals or places.

The University of New Mexico's involvement in the establishment of a consortium of Rocky Mountain and High Plains universities, the Western Regional Scientific Laboratory, Inc., and its attempt to manage the Los Alamos Scientific Laboratory, all of which are described and analyzed in this study, are unique. For these reasons as well, it would be difficult to mask identities effectively. It was decided, therefore, to retain the identities of persons, places, and events with two provisions: (1) that a consideration fundamental to ethnographic research methodology be observed, i.e., that the author handle the data in a sensitive and thoughtful manner, and (2) that the author provide the individuals who participated in the events the opportunity to review and comment on the initial chapters of the study in which their names appeared and in which they were quoted. This process of review and comment by the participants, although adding an additional demand on time required for completion, also contributes to the study's validity. In addition, the decision not to attempt masking the reporting of data was based, in part, "on the recognition that the history being reported was generated by public officials" (Higbie, 1981, p. 49), who, in the performance of their duties, were "publicly accountable for the actions which it is [their] duty to perform" (Rainwater and Pittman, 1969, p. 87). However, discretion and the appreciation of the sensitive nature of the personal feelings and lives of those concerned in this study are perhaps a "less rigorous standard" (Higbie, 1981, p. 49) on which to base such a decision. It is, nonetheless, a fundamental and over-riding concern of those who utilize qualitative research techniques.

The following people, together with their titles during the 1967-1978 period under discussion, were interviewed: Dr. Paul Silverman, Associate Provost for Research and Academic Services; Mr. Edmund B. Kasner, Director of Research Administration; Mr. Milton Jenkins, Project Director; Colonel William Grant (ret.)., Assistant Project Director; Mr. L. E. Roberts, Associate Director of The Institute for Applied Research Services; Mr. Peter D. Rask, University Counsel; Dr. Ferrel Heady, President; Dr. Chester C. Travelstead, Provost; McAllister H. Hull, Jr., Provost, and Mr. John Perovich, Vice-President for Business and Finance. Those persons who were named or directly quoted in the study were given the opportunity to review and comment on the accuracy of the historical events reported. The following people who reviewed Chapters I and II signed a data-review and approval form indicating their satisfaction with the accuracy of the events reported: Dr. Paul Silverman, Mr. Edmund B. Kasner, Mr. Milton Jenkins, Colonel William Grant (ret.), Mr. L. E. Roberts, Dr. Ferrel Heady, Dr. Chester C. Travelstead, Dr. McAllister Hull, and Mr. John Perovich.

Data Analysis

An effort was made to correlate and analyze the data during the last seven-month period of this study. Categories developed as a result of preliminary studies were coded and examined for a "goodness of fit" (McCall and Simmons, 1969, p. 233), with new data emerging from interviews and documents during the last phase of the study. These categories were refined through constant comparison (Glaser and Strauss, 1967) between the original definitions and the emerging data.

The process of data collection and analysis was refined, focused, and directed through the process of "theoretical sampling" suggested by Glaser and Strauss (1967, p. 45). Preliminary categories were examined and redefined, and new categories and sub-categories were generated and tested throughout the study. Data that supported the emerging concepts were designated. By examining and comparing the contexts and concepts, probable relationships were formulated and examined. Through this process, several concepts emerged that were felt to be most applicable in illuminating the phenomena under study and substantially accounted for in the data. The emergent concepts were then elaborated and ordered in propositional form.

The manner in which the University of New Mexico adapted to changes in its environment and developed in the direction of a research institution during a period when federal research support had become more unstable and competition for research funds had increased was both multi-faceted and multi-dimensional; it was therefore necessary to explore and illuminate the relationships between the emerging concepts and the data within each of the categorical areas developed. To accomplish this, four longitudinal time-periods were identified and chronologically ordered: (1) the initial period of internal reorganization of the University's structure for research; (2) the period of informal and formal inter-organizational cooperation among members of the Intermountain University Research Administrators (IMURA); (3) the period of initial cognitive imaging of the new organization (WRSL, Inc.) and the shift to more active political involvement by the University of New Mexico in protecting the resource interests of the University, and (4) the period during which the

University participated in an attempt to incorporate a portion of its external research-support environment. These periods, although not chronologically exclusive, were indicative of the distinctive periods of development that emerged from the data and that were pertinent to the multi-faceted, multi-dimensional manner in which the University responded to environmental changes.

Generation of Theory

The development of "grounded theory", which attempts to explain how universities develop in the direction of research institutions, was the final outcome of the study. However, the immediate applicability of the theory should be reserved. Grounded theories emerge from limited ranges of data and are limited to contextual ranges of applications. The development of "special theories adequate to limited ranges of social data [rather than] . . . the search for all-inclusive conceptual schemes" (Merton, 1957, pp. 9-10) is of paramount importance in this study.

It should be emphasized "that the value of grounded-theory research rests not in the explicit statistical validation of existing theory but, rather, in the discovery of new understandings and insights as well as the development of data-based theory" (Blase, 1982, p. 110). This study does not assert that the grounded theory developed here will reflect the manner in which all institutions adjust to changes in their environment or the manner in which they will develop in the direction of graduate research institutions. Rather, it is based on the premise that understanding the response of one institution in one setting may contribute to the fundamental and general understanding of how institutions of higher education respond

to their environment and pursue development into research organizations. Although the setting changes from one institution to another, it is suggested that the grounded theoretical framework developed here probably reflects elements that can contribute to a better understanding of how any university interacts with its environment and develops in the direction of a research institution. Indeed, the validity of such a proposition can be tested most adequately by engaging in a future empirical research effort that can build upon ideas generated in the emergent theory (Blase, 1982; Zetterberg, 1965).

The data-based or "grounded theory" was intially organized as a "set of determinants" (Zetterberg, 1965). As the data emerged and propositions were developed, the relationships suggested by each propositional statement were tested. These concepts and their correlation to organizational responses to external environmental change may be appropriately applied to a number of situations and there be contextually useful and predictive. Although the findings may be extrapolated for a more generalized application, the proposed theoretical explanation of the phenomenon studied had to be examined with respect to the threats to validity.

The sources of invalidity in document analysis and interviewing are treated cogently by Angell and Freedman (1953), Gottschalk (1965), and Webb, Campbell, Schwartz, and Secrest (1966). The sources of invalidity in both document analysis and interviewing were divided into three classifications: (1) errors originating in incidents or individuals being studied; (2) errors originating with the author; and (3) errors related to imperfections in the author's data sampling techniques. Although the author was aware of these threats to the validity to the document and interview data and made conscious efforts to control these sources of data invalidity, the length of time

between the events and the study may have contaminated the data and therefore the author's conclusions. The memory of participants and author, over the intervening years, may have faltered; events may have been reported differently than they occurred. The passage of time, the retirement of the participants from the immediate events, associations with other participants, and the contextual milieu may have affected the views and perceptions of both the author and the participants interviewed. In retrospect, there were limited instances of inconsistency between the data obtained through interviews and through document analysis. More specific information, such as dates of events, the names of participants, and places was obtained through document analysis than through interviewing. However, the interview data complemented this information by providing recollections of reactions, perceptions, and interpreations of those same events.

Other variables in data-gathering are possible. The interviews were conducted over a six-month period; variance in the author's behavior could have occurred during this time. Too, the degree of attention to detail was substantially greater during the initial stages of the interviewing process than it was at the end. In many cases, the preponderance of mutually-confirming data caused the author's previous close attention to detail to become less rigorous.

Data-sampling as a source of error in this study was considered but set aside. Although the University of New Mexico was the organizational focus of the study, the events which occurred in response to the University's external research-support environment emerged as categorical sub-units of analysis. Data concerning these events were collected from participants, described, examined, defined, re-

examined, redefined and compared before the conceptual categories were determined. These conceptual categories were the avant-couriers of the "grounded theory" which attempted to explain the phenomenon studied. The multi-method approach employed in this study deliberately sought to obtain the contextually-relevant perspectives of the participants both in documents and interviews during the period under study. It also tested the author's accuracy of observation by providing collaboration from the participants, who provided data or were quoted in the descriptive narrative review and comment on these chapters. The author applied an additional test: he continually consulted the relevant literature as the concepts emerged from the data. The utilization of a multi-method approach to data-collection and analysis contributed to "triangulating" (Campbell and Fiske, 1959; Rist, 1982) the data in a manner adequate to allay criticism concerning the validity of the study.

Although thorough and persistent efforts were made to identify statistical data on external support for University research, development and demonstration expenditures (RD&D) for 1967-1978, the data available in internal reports and documents were incomplete. In addition, the following limitations on the data are noted: (1) data on the number of proposal actions, the number of proposals funded, and total RD&D expenditures were not available for some years; (2) data on the number of proposal actions, the number of proposals funded, or total expenditures were not reported separately for Federal, State, foundation, and corporate support, and (3) data on the number of proposal actions, the number of proposals funded, and total expenditures were not reported separately for research, demonstration, instruction, etc. The limitations of such

data must be identified and their use qualified. Rather than placing an emphasis on the statistical data, these were used in combination with other documents and interview data as a means of observing some broad trends and gaining some general insights into the RD&D efforts on campus between 1967-1978.

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